

In the Specification

Kindly replace the first full paragraph on page 1 with the following:

Technical Field

~~The invention~~ This disclosure relates to a poly(lactic acid) polymer composition comprising poly(lactic acid) and a cellulosic ester as main components, its production method, a molded article, a film, and a sheet of the composition.

Kindly replace the paragraph spanning pages 3 and 4 and subsequent paragraphs through to the top of page 5 with the following:

~~The invention~~ It could, therefore, aims be helpful to provide a poly(lactic acid) polymer composition excellent in the transparency, mechanical properties, and thermostability, a biaxially drawn film, and a molded article.

Disclosure of the Invention Summary

~~Inventors of the invention have~~ We found that a resin composition containing a poly(lactic acid) polymer and a cellulosic ester has excellent compatibility or affinity and excellent thermostability ~~and thus have completed the invention~~.

That is, ~~the invention provides~~ we provide a poly(lactic acid) polymer composition containing (A) a poly(lactic acid) polymer with a weight average molecular weight of 50,000 or higher and (B) a cellulosic ester.

Further, ~~the present inventors have~~ we found that a biaxially drawn film containing poly(lactic acid) polymer and at least one compound selected from cellulosic esters, poly(meth)acrylates, and polyvinyl compounds having a glass transition temperature of 60°C or higher has excellent transparency and thermostability and capable of retaining rigidity at the glass transition temperature of the poly(lactic acid) ~~and thus have completed the invention~~.

That is, ~~the invention provides~~ we provide a biaxially drawn film containing (A) poly(lactic acid) polymer with a weight average molecular weight of 50,000 or higher and (B) at least one compound selected from cellulosic esters, poly(meth)acrylates, and polyvinyl compounds having a glass transition temperature of 60°C or higher. From a viewpoint that both of the transparency and thermostability are satisfied, the poly(lactic acid)-containing biaxially drawn film is preferable to

have a content of the (B) component in a range of 1% by weight or more and less than 50% by weight in the total content of the (A) component and (B) component.

Practically, the invention composition is as shown in Fig. 1 and Fig. 2. In Fig. 1 showing the dispersion state of the respective components of the composition of Example 1, no structure is observed and in Fig. 2 showing the dispersion state of the respective components of the composition of Example 3, a regular both continuous phase structure is observed.

Kindly replace the paragraph spanning pages 5 and 6 and subsequent paragraphs through to the penultimate full paragraph on page 7 with the following:

Best Mode for carrying out the Invention Detailed Description

A poly(lactic acid) polymer ~~to be used in the invention~~ is required to have a weight average molecular weight of 50,000 or higher, preferably 80,000 or higher, and 100,000 or higher, so as to satisfy practically usable mechanical properties. The weight average molecular weight here means the molecular weight calculated by conversion into poly(methyl methacrylate) (PMMA) measured by gel permeation chromatography.

The poly(lactic acid) polymer ~~of the invention~~ is a polymer comprising L-lactic acid and/or D-lactic acid as main components and may contain copolymerizable components other than lactic acid. Examples of other monomer units are glycol compounds such as ethylene glycol, propylene glycol, butanediol, heptandiol, hexanediol, octanediol, nonanediol, decanediol, 1,4-cyclohexanedimethanol, neopentyl glycol, glycerin, pentaerythritol, bisphenol A, polyethylene glycol, polypropylene glycol, and polytetramethylene glycol; dicarboxylic acids such as oxalic acid, adipic acid, sebacic acid, azelaic acid, dodecanedioic acid, malonic acid, glutaric acid, cyclohexanedicarboxylic acid, terephthalic acid, isophthalic acid, phthalic acid, naphthalenedicarboxylic acid, bis(p-carboxyphenyl)methane, anthracenedicarboxylic acid, 4,4'-diphenyl ether dicarboxylic acid, sodium 5-sulfoisophthalate, and 5-tetrabutylphosphonium isophthalate; hydroxycarboxylic acids such as glycolic acid, hydroxypropionic acid, hydroxybutyric acid, hydroxyvaleric acid, hydroxycaproic acid, and hydroxybenzoic acid; and lactones such as caprolactone, valerolactone, propiolactone, undecalactone, and 1,5-oxepan-2-one. The copolymerization amount of the above-mentioned other copolymerizable components is preferably 30% by mole or less and more preferably 10% by mole or less in the entire monomer components.

~~In this invention, in order to~~ To obtain a resin composition and a biaxially drawn film having particularly high thermostability, it is preferable to use lactic acid components with high optical purity as poly(lactic acid) polymer. It is preferable to contain L-isomer or D-isomer in an amount of 80% or more in the total lactic acid components of the poly(lactic acid) polymer: it is more preferable to contain L-isomer or D-isomer in an amount of 90% or more: and it is even more preferable to contain L-isomer or D-isomer in an amount of 95% or more.

Kindly replace the second and third full paragraphs on page 7 with the following:

The melting point of the poly(lactic acid) polymer is not particularly limited. ~~However~~ however, it is preferably 120°C or higher and more preferably 150°C or higher. The melting point of the poly(lactic acid) polymer is generally increased by heightening the optical purity of the lactic acid component and the poly(lactic acid) polymer with a melting point of 120°C or higher can be obtained by adjusting the content of L-isomer 90% or higher or D-isomer 90% or higher. The poly(lactic acid) polymer with a melting point of 150°C or higher can be obtained by adjusting the content of L-isomer 95% or higher or D-isomer 95% or higher.

The cellulosic ester ~~in the invention~~ means celluloses whose hydroxyl groups are terminated by an esterification agent. Practical examples of the esterification agent are acid chlorides (e.g. acetyl chloride, propionyl chloride, and the like), acid anhydrides (e.g. acetic anhydride, propionic anhydride, butyric anhydride, and the like), carboxylic acid compounds (e.g. acetic acid, propionic acid, butyric acid, and the like), carboxylic acid compound derivatives (e.g. amide compounds, esterified compounds, and the like), and cyclic esters (e.g. ϵ -caprolactone).

Kindly replace the second full paragraph on page 8 with the following:

To improve the transparency, which will be described later, ~~in this invention~~, it is preferable to add one or more kinds of solvation agents for improving the compatibility of the poly(lactic acid) polymer and cellulosic esters. Preferable examples of such solvation agents are high molecular weight compounds containing organometal compounds and/or methacrylic polymer units by grafting or copolymerization.

Kindly replace the paragraph spanning pages 11 and 12 and subsequent paragraphs though mid page 14 with the following:

The poly(lactic acid) polymer composition of the invention can be produced by producing a composition by evenly mixing solutions obtained by dissolving the respective components in solvents and then removing the solvents, however a melt kneading method, which is a practical production method, requiring no dissolution of raw materials in solvents and removal of the solvents is preferable to be employed. The melt kneading method is a production method involving melting and kneading the respective components. The melt kneading method is not particularly limited and conventionally known mixing apparatuses which are used commonly, such as a kneader, a roll mill, a Bumbury's Banbury mixer, and an uniaxial or biaxial extruder may be used. In terms of the productivity, the uniaxial or biaxial extruder is preferable to be used among them. The mixing order is not particularly limited and for example, a method involving dry blending the poly(lactic acid) and the cellulosic ester and then supplying the blended mixture to the melt kneader; and a method of previously producing a master batch by melting and kneading the poly(lactic acid) and the cellulosic ester and then melt-kneading the poly(lactic acid) with the master batch can be exemplified. Further, based on the necessity, a method of melting and kneading other additives simultaneously and a method of previously producing a master batch by melting and kneading the poly(lactic acid) and the cellulosic ester and then melt-kneading the poly(lactic acid) and the cellulosic ester with the master batch may be employed. The temperature at the time of melt-kneading is preferably in a range from 190°C to 240°C and to prevent deterioration of the poly(lactic acid), it is more preferably in a range from 200°C to 220°C.

Since the poly(lactic acid) polymer composition produced through the melt-kneading in the invention is excellent in compatibility or affinity, the composition is excellent in the transparency and in the case the poly(lactic acid) polymer composition is formed into a 0.2 mm-thick sheet, it is made possible to obtain a sheet with a luminous transmittance 40% or higher for visible light rays generally with wavelength 400 nm. Further, in a preferable embodiment, it is made possible to obtain a sheet having a luminous transmittance 50% or higher for visible light rays generally with wavelength 400 nm. In a more preferable embodiment, it is made possible to obtain a sheet having a luminous transmittance 60% or higher for visible light rays generally with wavelength 400 nm.

The poly(lactic acid) polymer composition of the invention is excellent in compatibility or affinity and may possibly have a solvation structure of the poly(lactic acid) polymer composition and the cellulosic ester and/or a phase structure with 0.01 μm or smaller depending on the type and the addition amount of the cellulosic ester added and in this case, the composition is particularly excellent in transparency and is therefore preferably suitable for various transparent uses. Here, solvation means that both components are evenly mixed in molecular level. Concretely, it means that neither one of the phases of different main components of a two-component polymer forms phase structure of 0.001 μm or larger. Non-solvation means the case of no solvation state, in other word, it means that the phases of different main components of a two-component polymer form phase structure of 0.001 μm or larger. Whether solvation is caused or not can be judged by an electron microscope, a differential scanning calorimetry(DSC), and other various methods as described in "Polymer Alloy and Polymer Blend"(L. A. Utracki, translated by Toshio Nishi, Tokyo Kagaku Dojin, p. 111, 1991). As the most general method for solvation determination is a method for the judgment by the glass transition temperature. In the case solvation is caused, the glass transition temperature changes more than that of each component alone and in many cases, a single glass transition temperature appears. As a measurement method of the glass transition temperature, both of a method of measurement by DSC and a method of measurement by a dynamic viscoelasticity test may be employed.

With respect to the poly(lactic acid) polymer composition of the invention, depending on the types and the mixing amount of the cellulosic ester, the poly(lactic acid) polymer composition and the cellulosic ester may possibly have a both continuous phase structure with structure of 0.01 to 3 μm or a dispersion structure of 0.01 to 3 μm inter-particle distance and in these cases are also preferable since the mechanical property and the thermostability are both satisfied. It is supposed that these both continuous phase structure and dispersion structure are formed by phase separation by Spinodal decomposition after solvation once occurs at the time of melt-kneading, however it is not limited to that. To confirm these continuous phase structure and dispersion structure, for example, formation of the both continuous phase structure can be confirmed by optical microscopic observation and transmittance electron microscopic observation and it can be confirmed based on the appearance of scattering maximum peak in the scattering measurement carried out by a light scattering apparatus or a small angle x-ray scattering apparatus. In this connection, since the light

scattering apparatus and the small angle x-ray scattering apparatus differ the optimum measurement ranges, they may be used properly based on the structural period. The presence of the scattering maximum peak in the scattering measurement proves the polymer composition has a regular phase separation structure with a certain period and the period Λ_m corresponds to the structural period in the case of the both continuous phase structure and to the inter-particle distance in the case of the dispersion structure. The value can be calculated from the following equation:

$\Lambda_m = (\lambda/2)/\sin(\theta_m/2)$ wherein λ represents the wavelength in the scattering body of the scattered light and θ_m represents the scattering angle giving the maximum scattering peak.

Kindly replace the second full paragraph on page 15 with the following:

The poly(lactic acid) polymer composition of the invention may contain organic fillers derived from natural substances. The organic fillers derived from natural substances are not particularly limited and may be natural substances and preferably those which contain cellulose.

Kindly replace the paragraph spanning pages 17 and 18 with the following:

The weight ratios of aluminum, silicon, calcium, sulfur and magnesium are not particularly limited, however it is preferable that aluminum 1 to 60% by mole, silicon 20 to 90% by mole, calcium 1 to 30% by mole, sulfur 1 to 20% by mole, and magnesium 0 to 20% by mole in the case the total of the elements is set to be 100; it is more preferable that aluminum 10 to 55% by mole, silicon 20 to 85% by mole, calcium 1 to 25% by mole, sulfur 1 to 15% by mole, and magnesium 0 to 10% by mole; and it is even more preferable that aluminum 20 to 50% by mole, silicon 25 to 80% by mole, calcium 3 to 20% by mole, sulfur 2 to 10% by mole, and magnesium 0 to 8% by mole. Elementary analysis of them may be carried out for single substance of the natural material-derived organic filler and ashes of the natural material-derived organic filler and in this invention ashes are employed. The elementary analysis can be carried out by using apparatuses for fluorescent x-ray analysis, atomic absorptiometry, and scanning electron microscope (SEM) or transmission electron microscope (TEM) in combination with energy dispersion type x-ray microanalyzer (XMA) and in this example, fluorescent x-ray analysis is employed.

Kindly replace the full paragraph on page 18 with the following:

As the paper powder, in terms of moldability, it is preferable to contain cellulose bearing fine particles on the surface. The fine particles are not particularly limited and may be inorganic filler contained in the above-mentioned adhesives or organic matters or other inorganic matters, however the particles are preferable to contain silicon and aluminum. The shape of the fine particles may be a needle-like, plate-like or spherical shape. The size of the fine particles is not particularly limited, however it is preferable to be distributed in a range of 0.1 to 5000 nm, more preferably 0.3 to 1000 nm, furthermore preferably 0.5 to 500 nm, even more preferably 1 to 100 nm, and most preferably 1 to 80 nm. That to be distributed in specified range means that 80% or more of the total number of the fine particles are within the specified range. The adhesion state of the fine particles may be in state of agglomeration or dispersion. However however, they are more preferable to be deposited in the dispersion state. The size of the fine particles can be observed by observing a molded article obtained from a resin composition containing a natural resin and a natural organic filler with a transmission electron microscope at 80,000 magnification and the total number of fine particles to be observed is set to be randomly 100 pieces.

Kindly replace the first full paragraph on page 19 and subsequent paragraphs through to the bottom of page 20 with the following:

~~In the invention, fillers~~ Fillers (e.g. glass fiber, carbon fiber, other organic fibers, ceramic fiber, ceramic bead, asbestos, wallastonite, talc, clay, mica, sericite, zeolite, bentonite, dolomite, kaolin, finely powdered silicic acid, feldspar powder, potassium titanate, shirasu balloon, calcium carbonate, magnesium carbonate, barium sulfate, calcium oxide, aluminum oxide, titanium oxide, aluminum silicate, silicon oxide, gypsum, novaculite, dawsonite, and white clay); stabilizers (e.g. an antioxidant and an ultraviolet ray absorbent), lubricants, release agents, fire-retarding agents, coloring agents including dyes and pigments, and nucleating agents can be added without departing from the spirits spirit and scopes scope of the invention our disclosure.

~~In the invention, at~~ At least one or more kinds of other thermoplastic resins (e.g. polyacetal, polyethylenes, polypropylenes, polyamides, polyphenylene sulfide resins, polyether ether ketone resins, polyesters, polysulfones, polyphenylene oxides, polyimides, and polyether imides), thermosetting resins (e.g. phenyl resins, melamine resins, polyester resins, silicone resins, and epoxy

resins), and soft thermoplastic resins (e.g. polyester elastomers, polyamide elastomers, ethylene/propylene terpolymers, ethylene/but-1-ene copolymers) can be added without departing from the ~~spirit~~ spirit and scope of the invention our compositions.

Since the resin composition ~~of the invention~~ is excellent in compatibility or affinity and can be melt-kneaded, it can be used by being processed into various molded articles by injection molding or extrusion molding. Examples of the molded articles are injection-molded articles, extrusion-molded articles, blow-molded articles, films, fibers and sheets. As the films, various films such as un-drawn, uniaxially drawn, and biaxially drawn films and inflation films can be used and as fibers, various kinds of fibers such as unstretched yarns, stretched yarns, and ultra stretched yarns can be used. These articles may be used in a wide range of uses such as electric and electronic parts, construction member, automotive parts, and daily goods.

~~The inventors have~~ We found that a biaxially drawn film containing poly(lactic acid) polymer and at least one compounds selected from cellulosic esters, poly(meth)acrylates, and polyvinyl compounds having a glass transition temperature of 60°C or higher has excellent thermostability and capability of retaining the rigidity at the glass transition temperature of the poly(lactic acid) and thus disclose it herein.

The cellulosic ester to be used for the biaxially drawn film ~~of the invention~~ means celluloses whose hydroxyl groups are terminated by an esterification agent. Herein, the termination means forming ester bonds by chemical bonding of the hydroxyl groups and an esterification agent. To maintain high thermostability, it is preferable to use an esterification agent having 1 to 10 carbon atoms. Practical examples of the esterification agent are acid chlorides (e.g. acetyl chloride, propionyl chloride, and the like), acid anhydrides (e.g. acetic anhydride, propionic anhydride, butyric anhydride, and the like), carboxylic acid compounds (e.g. acetic acid, propionic acid, butyric acid, and the like), carboxylic acid compound derivatives (e.g. amide compounds, esterified compounds, and the like), and cyclic esters (e.g. ϵ -caprolactone).

Practical types of the cellulosic ester ~~to be used in the invention~~ are cellulose acetate, cellulose diacetate, cellulose triacetate, cellulose acetate propionate, cellulose acetate butyrate, and cellulose acetate phthalate and in terms of compatibility or affinity, cellulose diacetate, cellulose triacetate, cellulose acetate propionate, cellulose acetate butyrate, and cellulose acetate phthalate are preferable among them and cellulose triacetate and cellulose acetate propionate are more preferable.

Kindly replace the second full paragraph on page 21 and subsequent paragraphs through to the bottom of page 22 with the following:

The poly(meth)acrylate ~~in the invention~~ means those which comprise at least one monomer selected from acrylates and methacrylates and may include copolymers of two or more kinds of monomers. The acrylates and methacrylates to compose the poly(meth)acrylate are, for example, acrylates such as methyl acrylate, ethyl acrylate, n-propyl acrylate, n-butyl acrylate, cyanoethyl acrylate, and cyanobutyl acrylate, and methacrylates such as methyl methacrylate, ethyl methacrylate, cyclohexyl methacrylate, and 2-hydroxyethyl methacrylate and poly(methyl methacrylate) is preferable to be used for providing higher high temperature rigidity.

The poly(meth)acrylate ~~to be used in the invention~~ is preferable to have preferably has a weight average molecular weight of 20000 to 500000 and more preferable to have the weight average molecular weight of 100000 to 200000. If the weight average molecular weight is less than 20000, the strength of the molded article is sometimes deteriorated and if the weight average molecular weight exceeds 500000, the fluidity at the time of molding is sometimes decreased.

A method of polymerizing or copolymerizing these monomers is not particularly limited and a conventionally known polymerization method such as bulk polymerization, solution polymerization, and suspension polymerization can be employed.

The polyvinyl compound ~~in this invention~~ include polymers of vinyl compounds and among them, it is required to use compounds having a glass transition temperature of 60°C or higher. If the glass transition temperature is lower than 60°C, the effect to improve the thermostability of the poly(lactic acid) is lowered even if the solvation with the poly(lactic acid) is caused and therefore, it is not preferable. Practical examples of the polyvinyl compounds having a glass transition temperature of 60°C or higher, various kinds of styrene polymers such as polystyrene, poly(4-acetylstyrene), poly(2-methylstyrene), poly(3-methylstyrene), poly(4-methylstyrene), poly(4-methoxystyrene), poly(4-hydroxystyrene) (polyvinyl phenol), poly(2-hydroxymethylstyrene), poly(3-hydroxymethylstyrene), and poly(4-hydroxymethylstyrene); and poly(benzoyloxyethylene), poly(cyclohexanoyloxyethylene), poly(4-ethoxybenzoyloxyethylene), poly(2-methoxybenzoyloxyethylene), poly(4-methoxybenzoyloxyethylene), and poly(4-

phenylbenzoyloxyethylene) and in terms of the affinity with the poly(lactic acid) polymer, poly(4-hydroxystyrene) (polyvinyl phenol) is preferable to be used.

The poly(lactic acid) film ~~of the invention~~ is required to be a biaxially drawn film drawn in both directions, the longitudinal direction and the width direction, in terms of the thermostability. In the case a film other than the biaxially drawn film is used at a glass transition temperature of the poly(lactic acid), thermal deformation or thermal crystallization takes place and it is not desirable in terms of the quality stability.

~~In the invention, to~~ To further improve the transparency, which will be described later, it is preferable to add one or more kinds of solvation agents for improving the affinity of the poly(lactic acid) polymer composition with the cellulosic ester and/or poly(meth)acrylate and/or the polyvinyl compound (hereinafter, referred to as an alloying component). Examples preferable for the solvation agent are high molecular weight compounds containing organometal compounds and/or (meth)acrylic polymer units by grafting or copolymerization.

Kindly replace the paragraph beginning on page 26 and subsequent paragraphs through to the top of page 29 with the following:

The poly(lactic acid) biaxially drawn film ~~of the invention~~ can be produced by evenly mixing solutions obtained by dissolving the respective components in solvents and removing the solvents, and then carrying out film formation, however a melt kneading method, which is a practical production method, requiring no dissolution of raw materials in solvents and removal of the solvents is preferable to be employed. The melt kneading method is a production method involving melting and kneading the respective components. The melt film formation method is not particularly limited and methods involving obtaining a resin composition using a conventionally known mixing apparatuses which are used commonly, such as a kneader, a roll mill, a Banbury's Banbury mixer, and an uniaxial or biaxial extruder, and then leading the melted and mixed resin composition to a slit-like mouth cap, extruding the resin composition in a sheet-like form on a cooling casting drum, and obtaining a sheet by a T-die method or a touch roll casting method. Among them, in terms of the productivity, it is preferable to form a sheet by using a uniaxial or biaxial extruder. The mixing order of the polymer is not particularly limited and for example, a method involving dry blending the poly(lactic acid) and the alloying component and then supplying the blended mixture to the melt

kneader; and a method of previously producing a master batch by melting and kneading the poly(lactic acid) and the alloying component and then melt-kneading the poly(lactic acid) with the master batch can be exemplified. Further, based on the necessity, a method of melting and kneading other additives simultaneously and a method of previously producing a master batch by melting and kneading the poly(lactic acid) and other additives and then melt-kneading the poly(lactic acid) and the alloying component with the master batch may be employed. The temperature at the time of melt-kneading is preferably in a range from 190°C to 240°C and to prevent deterioration of the poly(lactic acid), it is more preferably in a range from 200°C to 220°C.

In terms of the thermostability, the degree of the crystallinity of the poly(lactic acid) biaxially drawn film of the invention is preferably 50% or higher and more preferably 60%. The upper limit of the degree of the crystallinity is not particularly limited, however it is preferably 90% or lower. The measurement of the degree of the crystallinity may be carried out by any conventionally known measurement method such as a density method, a DSC method, and an x-ray deflection method and in the case of analyzing with x-rays, the measurement is carried out by separating crystal regions and non-crystal regions different from each other in the scattering of x-rays, measuring the integrated intensity of the respective regions, and carrying out calculation from the measurement results. A method of achieving the degree of the crystallinity is not particularly limited. However however, as a method to be employed preferably, thermal treatment to be carried out after film formation can be exemplified. Such thermal treatment may be carried out at an optional temperature not higher than the melting point of the poly(lactic acid) polymer composition and preferably 80 to 150°C and even more preferably 100 to 150°C. The thermal treatment may be carried out while the film being loosened in the longitudinal direction and/or the width direction.

The poly(lactic acid) biaxially drawn film of the invention is excellent in transparency and film haze is preferably 10% or lower, more preferably 7% or lower, and even more preferably 5% or lower. Herein, the film haze is a value calculated by conversion into a 10 µm-thick film to the basis of the haze value of a film sample whose thickness is previously measured. It is preferable that the value is 10% or lower even in the actually measured value before the conversion.

The glass transition temperature of the poly(lactic acid) is about 60°C and if it exceeds 60°C, the modulus of elasticity tends to be decreased, however the biaxially drawn film of the invention has a modulus of elasticity increasing at the glass transition temperature or higher and the thermal

deformation in the case of use at the glass transition temperature or higher is hard to occur and in such a manner that the thermostability and rigidity at a high temperature are remarkably improved. From this viewpoint, the poly(lactic acid) biaxially drawn film of the invention preferably has a modulus of elasticity of 300 MPa or higher, more preferably 500 MPa or higher, and even more preferably 700 MPa at 80°C.

The poly(lactic acid) biaxially drawn film of the invention may contain various kinds of particles in accordance with purposes and uses. The particles to be added are not particularly limited without departing from the spirits spirit and seopes scope of the invention this disclosure and inorganic particles, organic particles, crosslinked high molecular weight particles, and inner particles to be produced in the polymerization system. Two or more types of these particles may be added in combination. In terms of the mechanical properties of the poly(lactic acid) film, the addition amount of the particles is preferably 0.01 to 10% by weight and even more preferably 0.02 to 1% by weight.

The poly(lactic acid) biaxially drawn film of the invention may contain a proper amount of additives such as flame retardants, heat stabilizers, antioxidants, ultraviolet absorbents, antistatic agents, plasticizers, tackifiers, fatty acid esters, organic lubricants such as waxes, defoaming agents such as polysiloxanes, and coloring agents such as pigments and dyes in accordance with necessity without departing from the spirits spirit and seopes scope of the invention disclosure.

Kindly replace the first full paragraph on page 30 with the following:

The poly(lactic acid) biaxially drawn film of the invention may be used while being molded. The molded article is considerably suppressed from thermal deformation under heating condition and can be used as a heat resistant container. The molding method is not particularly limited and conventionally known various molding methods such as straight molding, free drawing molding, plug and ring molding, skeleton molding, plug-assist molding and the like can be employed.

Kindly replace the first full paragraph on page 31 and subsequent paragraphs through to mid page 32 with the following:

The thickness of the biaxially drawn film of the invention can be set optionally in accordance with the purposes of the use of the film and the thickness is generally in a range of 0.5 to 300 μm and

in terms of the film formation stability, the thickness is preferably 1 to 200 μm and more preferably 5 to 180 μm .

The poly(lactic acid) biaxially drawn film of the invention can be improved in the adhesion property and the printing property based on the necessity by carrying out surface treatment such as corona discharge treatment. Further, various coatings may be formed and the types of the coating compounds, coating methods, and thickness are not particularly limited without departing the spirit and scope of the invention disclosure. If necessary, molding processing such as embossing process and printing may be carried out for use of the film.

The poly(lactic acid) biaxially drawn film of the invention obtained in such a manner can be used in form of a single film or a composite film for various industrial materials and wrapping materials required to have transparency and thermostability.

The molded article made of the poly(lactic acid) biaxially drawn film of the invention can also be used for various materials required to have transparency and thermostability. Practically, it can be used for various containers and wrapping materials in food industries, sanitary and daily life goods, agricultural and horticultural fields.

The resin composition of the invention is a mixture of the poly(lactic acid) and the cellulosic ester, which are a biomass type materials, and is a resin composition excellent in transparency, mechanical properties, and thermostability. Further, the biaxially drawn film of the invention which is excellent in transparency, mechanical properties, and thermostability is obtained by biaxially drawing a resin composition obtained by mixing poly(lactic acid) and at least one kind compound selected from cellulosic esters, poly(meth)acrylates, and polyvinyl compounds having a glass transition temperature of 60°C or higher.

Examples

The invention compositions, films and methods will be described more in detail with reference to Examples.

Kindly replace the penultimate paragraph on page 36 with the following:

Fig. 3 shows a photograph of a sheet. According to the photograph, letters in the background can be seen through the sheet and therefore, the sheet of the invention disclosure was found excellent in the transparency.

Kindly replace the last paragraph on page 41 with the following:

Industrial Applicability

The invention provides a film compositions provide films usable for various kinds of wrapping materials, various kinds of industrial materials, and films for various industrial materials, and its application range should not be limited to these exemplified fields.